DIN EN 1911:2010-12 (E)

Stationary source emissions - Determination of mass concentration of gaseous chlorides expressed as HCl - Standard reference method

Contents

Page

Foreword 4

Introduction 5

1 Scope 6

2 Normative references 6

3 Terms, definitions and abbreviations 6
3.1 Terms and definitions 6
3.2 Abbreviations 9

4 Principle 11

5 Sampling 11
5.1 Sampling strategy 11
5.1.1 General 11
5.1.2 Non isokinetic sampling 12
5.1.3 Isokinetic sampling 13
5.1.4 Losses of gaseous chlorides and side reactions during sampling 14
5.2 Sampling equipment 14
5.3 Sampling procedure 18
5.3.1 Preparation and installation of equipment 18
5.3.2 Sampling procedure 19
5.3.3 Validation of results 20

6 Analysis 21
6.1 Introduction 21
6.2 Reagents and samples to be analysed 22
6.2.1 Reagents for analysis 22
6.2.2 Samples to be analysed 22
6.3 Silver titration: potentiometric method 22
6.3.1 Apparatus 22
6.3.2 Reagents and solutions 23
6.3.3 Procedure 23
6.3.4 Interferences 23
6.3.5 Calculations 24
6.4 Mercuric-thiocyanate spectrophotometry 24
6.4.1 Warning 24
6.4.2 Apparatus 24
6.4.3 Reagents 24
6.4.4 Procedure 25
6.4.5 Interferences 25
6.4.6 Calculations 26
6.5 Ion-exchange chromatography 26

7 Expression of results 27

8 Determination of the characteristics of the method: sampling and analysis 28
8.1 General 28
8.2 Relevant performance characteristics of the method and performance criteria 28

8.2.1 General 28
8.2.2 Sampling procedure 28
8.2.3 Analyse procedure 29
8.3 Establishment of the uncertainty budget 30

9 Measurement report 31

Annex A (informative) Examples of absorbers 32

Annex B (informative) Comparison between mercuric-thiocyanate spectrophotometry and ion exchange chromatography method (methods B and C) 34

Annex C (informative) Example of assessment of compliance of the reference method for chlorides 35

C.1 General 35
C.2 Process of uncertainty estimation 35
C.3 Specific conditions in the field 36
C.4 Performance characteristics of the method 37
C.5 Calculation of standard uncertainty of concentration measured 38
C.6 Calculation of the overall (or expanded) uncertainty 41
C.7 Uncertainty associated to the mass concentration of gaseous chlorides at O2 reference concentration 41

Annex D (informative) Performance characteristics of the whole measurement method 43

D.1 Analytical detection limit of the method 43
D.2 Repeatability and reproducibility of the method in the field 43

Annex E (informative) Significant technical changes 45

Bibliography 46